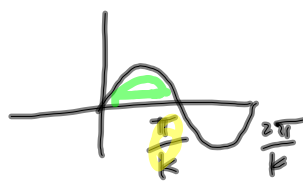


63. $k > 0$ $\int_0^{\pi/k} \sin(kx) dx = \frac{2}{k}$

period of $\sin(kx) = \frac{2\pi}{k}$

$A \sin(Bx)$
period $\frac{2\pi}{|B|}$



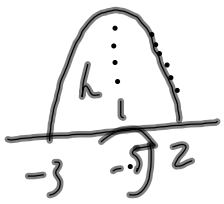
$-\frac{\cos(kx)}{k} \Big|_0^{\pi/k}$

$-\frac{\cos(\frac{k\pi}{k})}{k} - \left(-\frac{\cos 0}{k}\right)$

$\frac{1}{k} + \frac{1}{k} = \frac{2}{k}$

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64.



$A = \frac{2}{3} b \cdot h$

$h = f(-.5) = \frac{25}{4}$

$y = 6 - x - x^2$

$y = -(x+3)(x-2)$

$\int_{-3}^2 (6 - x - x^2) dx$

$6x - \frac{x^2}{2} - \frac{x^3}{3} \Big|_{-3}^2$

$\left(6 \cdot 2 - \frac{2^2}{2} - \frac{8}{3}\right) - \left(-18 - \frac{9}{2} + \frac{27}{3}\right)$

c) $\frac{2}{3} \cdot 5 \cdot \frac{25}{4} = \frac{125}{6} = \frac{125}{6}$

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5.3 solve $\left(\int_0^x e^{-t^2} dt = 0.6, x\right) = .699$

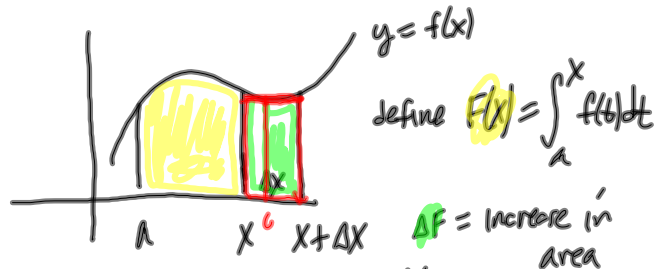
$$\int e^{-t^2} dt = ?$$

$$\frac{d}{dt} e^{-t^2} = e^{-t^2} \cdot (-2t)$$

~~$$\frac{d}{dt} e^{-t^2} = e^{-t^2} \cdot (-2t)$$~~

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5.4 more formal proof of FTC



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$$f(c) \cdot \Delta x = \Delta F \quad \therefore \Delta F \approx f(c) \Delta x$$

$$f(c) = \frac{\Delta F}{\Delta x} \quad \text{take } \lim_{\Delta x \rightarrow 0}$$

$$\lim_{\substack{\Delta x \rightarrow 0 \\ c \rightarrow x}} f(c) = \lim_{\Delta x \rightarrow 0} \frac{\Delta F}{\Delta x} = \lim_{\Delta x \rightarrow 0} \frac{F(x+\Delta x) - F(x)}{\Delta x}$$

$$\boxed{f(x) = F'(x)}$$

$F(x)$ is an anti
der

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$$\frac{d}{dx} \int_0^x \cos(t) dt = \cos x$$

\downarrow $F(x)$ \uparrow $f(x)$
 $\frac{d}{dx}$ $F'(x)$

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$$\frac{d}{dx} \int_0^{x^2} \cos t dt = \cos x^2 \cdot 2x$$

\uparrow
 comes from
 the chain rule

$$\frac{d}{dx} \int_a^u f(t) dt = f(u) \frac{du}{dx}$$

read ex. 3

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